

oxidizing the halogenated sulfoxide (III) to sulfone (I) [i.e., sulfoxide → halogenated sulfoxide → halogenated sulfone].

In contrast, Harayama discloses a production route in which a sulfide is oxidized to sulfone [i.e., sulfide → sulfone], and Kodama discloses a method of introducing a halogen atom into o-position of the benzene nucleus of a sulfide or sulfoxide [sulfide or sulfoxide → halogenated sulfide or sulfoxide].

The applicants have carefully considered the present rejection and strongly assert that Harayama fails to disclose the route of oxidizing sulfoxide to form sulfone.

With reference to the remarks in the Office Action regarding the scheme at page 2 of Harayama, please note that compound (VI) should have been “compound (IV)” to compound (I) in the reference.

The scheme disclosed at page 2 of Harayama specifically discloses only the route of oxidizing sulfide directly to form sulfone (see Example 3, at [0040]-[0041]). Thus, Harayama is substantially silent about the route of oxidizing sulfoxide to form sulfone, which is the second step of the presently claimed process for producing the desired compound of formula (I).

In order to obtain the halogenated sulfone (I) from sulfide, a person of ordinary skill in the art would therefore be motivated by the teaching of Harayama to oxidize sulfide to form sulfone to carry out halogenation with Pd thereafter, or to halogenate sulfide with Pd to conduct oxidization thereafter.

In contrast, the presently claimed process requires the two-step oxidization with an intermediary production of sulfoxide in between sulfide and sulfone. There is

no teaching, suggestion, or motivation in the Harayama nor Kodama that would have led one of ordinary skill to modify the cited references or to combine their teachings to arrive at the presently claimed process. Nor would it have been “obvious to try” by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.

The two-step oxidization of the presently claimed process is not obvious from the disclosure in Harayama. The applicants assert that the present rejection can only result from hind-sight based upon the presently claimed invention and not result from teachings of Harayama and Kodama.

As pointed out in the prior filed Amendment, upon consulting Kodama and Harayama, a person of ordinary skill in the art would have been motivated to try a route comprising oxidizing a sulfide to the corresponding sulfone and halogenating the sulfone with Pd catalyst to obtain the halogenated sulfone [sulfide → sulfone → halogenated sulfone]. Alternatively, the skilled person in the art would have been motivated to try a route comprising halogenating a sulfide with Pd catalyst to obtain the corresponding halogenated sulfide and oxidizing the halogenated sulfide to the halogenated sulfone [sulfide → halogenated sulfide → halogenated sulfone].

However, one of ordinary skill in the art would not have found any disclosure or suggestion, nor have been motivated, to try to make a halogenated sulfone through the presently claimed route, because the route is significantly different in that it is an indirect route via sulfoxide with two steps of oxidation.

Unexpectedly, the route of the presently claimed process has achieved significant reduction of the required amount of Pd catalyst and improvement of the

yield of the final product by detouring sulfoxides (II) and (III).

This has been clearly demonstrated in the examples of the present specification.

Thus, Examples 1 and 2 start from a sulfide. The final product is obtained in a yield of about 80% while the amount used of Pd catalyst is 1/10 the amount of the sulfide.

In contrast, Examples 3-8 start from a sulfoxide. The final product is obtained in a yield of about 80% to close to 90% while the used amount of Pd catalyst is 1/100-1/1000 the amount of the sulfoxide.

The results of the Examples 1 and 2 compared with the results of Examples 3-8, discussed above show new and unexpected results of the presently claimed invention.

The applicants again direct the Examiner's attention to the superiority and new and unexpected results of the presently claimed invention, shown by the side-by-side comparative experiments as set forth in the Rule 1.132 Declaration filed on June 26, 2008.

The experimental results shown in the Declaration clearly show a profound reduction (over 300% reduction) of the required amount of Pd catalyst and improvement in the yield of the final product. This has been achieved by the route according to the presently claimed invention which uses a sulfoxide as the starting material.

The comparative, experimental results set forth in the Rule 132 Declaration demonstrate new, unexpected and superior results of the presently claimed method.  
The presently claimed invention is fully allowable under Section 103(a) over the prior

art references.

Thus, the applicants submit that a person of ordinary skill in the art would not have been led to the presently claimed invention in view of Kodama and Harayama. The presently claimed invention is fully allowable under Section 103(a) in view of the prior art.

The applicants respectfully maintain their traverse the rejection of claims 1-5 on the ground of nonstatutory obviousness-type double patenting over claims 1 and 4 of US 7,057,067 (US '067) in view of Harayama et al. These references do not make the presently claimed invention to be obvious.

The applicants have discussed the teachings of Harayama et al. above and thoroughly distinguished the presently claimed process from the teachings of Harayama.

The claims 1 and 4 of US '067 fail to disclose or suggest the step in the presently claimed method of oxidation of a halogenated sulfoxide. Accordingly, the presently claimed process significantly differs from the subject matter of claims 1 and 4 of US '067, and is certainly not obvious in view of the cited US '067 claims.

The teachings of Harayama do not remedy the deficiencies of US '067 claims 1 and 4. Harayama discloses the step of oxidizing a sulfide directly to form sulfone, it neither discloses nor suggests the second step of the presently claimed invention of oxidizing a halogenated sulfoxide to a sulfone. Accordingly, the combined teachings of the US '067 claims and Harayama do not make the presently claimed invention to be obvious.

Moreover, the applicants submit that a person of ordinary skill in the art would not be led to combine the teachings of Harayama with the US '067 claims 1 and 4.

There is no suggestion or motivation to combine the two references because of the significant disparity in their teachings. The applicants assert that the combination of US '067 claims 1 and 4, plus Harayama is not tenable and should accordingly be withdrawn.

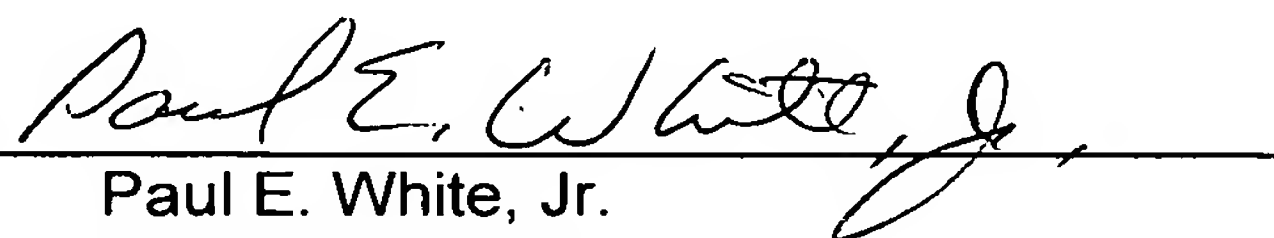
Even if the combined teachings of the US '067 claims 1 and 4, plus Harayama were considered, then such combination would not make the presently claimed method to be obvious for the reasons discussed above.

The presently claimed invention is no where disclosed, suggested or made obvious by the combination of US '067 claims 1 and 4, plus Harayama. The presently claimed invention is fully allowable over the cited references.

In view of the above and the Rule 132 Declaration filed June 26, 2008, it is believed that this application is in condition for allowance and a Notice to that effect is respectfully requested.

Respectfully submitted,

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